UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,449	07/29/2003	George Stephen Mecherle	7242-109D1	7785

167 7590 08/23/2005

FULBRIGHT AND JAWORSKI LLP
555 S. FLOWER STREET, 41ST FLOOR
LOS ANGELES, CA 90071

EXAMINER
SINGH, DALZID E

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/630,449	MECHERLE ET AL.	
	Examiner	Art Unit	
	Dalzid Singh	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-23,26-38,42-51 and 53-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-9,11-23,26-38,40,42-51 and 53-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 4,5, 10-12, 25, 41-43 and 52 is withdrawn in view of the newly discovered reference(s) to Takahashi et al, Kobayashi et al and Yamane et al. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 34-36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Britz et al (US Patent No. 6,731,878) in view of Takahashi et al (US Patent No. 6,771,729).

Regarding claim 1, Britz et al discloses free-space communication system, comprising:

a splitter in communication with the input to split the digital signal into a plurality of approximately equal laser data signals (as shown in Fig. 5, the serial to parallel converter (154) split the input signal into p a plurality of equal laser data signals, transmitted to laser transmitter (166));

a plurality of lasers (166) displaced from one another and facing in parallel directions, each of the lasers being in communication with the splitter (the lasers are in communication with the splitter);

Although Britz et al do not specifically disclose a plurality of laser drivers, however, it would have been obvious that there exist plurality of laser drivers to drive the laser transmitter (166).

Furthermore, Britz et al disclose free-communication system as discussed above and differ from the claimed invention in that Britz et al do not specifically discloses an input signal interface for receiving a digital signal. As shown in Fig. 1, Britz et al show plurality of devices communicating with each other. Therefore, it would have been obvious that there exist input signal interface for each device. One of ordinary skill in the art would have been motivated to provide such interface in order to convert the signal to a proper format and enable communication between other devices.

Britz et al disclose free space optical communication system comprising of transceiver and differ from the claimed invention in that Britz et al do not specifically disclose that the transceiver comprises of regenerator including first clock and data recovery which is switchable between one of the plurality of clock frequencies. However, in communication system it is well known to provide regenerators. Takahashi et al is cited to show such well known concept. In the abstract and col. 2, lines 46-61, Takahashi et al disclose recovery circuit which select clock signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide data regenerator as taught by Takahashi et al to the optical system of

Blitz et al. Since the optical signal is transmitted through communication medium, such as free-space, signal quality degrades over time, therefore one of ordinary skill in the art would have been motivated to provide such in order to recover and regenerate data.

Regarding claim 2, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the input signal is characterized by a data rate of at least 10 Mbits/second, and each laser is supplied with a nominal current of at least 100 mA. However, it would have been a matter of design choice to operate the system of Britz et al with such data rates and current values.

Regarding claims 34 and 35, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the transceiver further comprises a protective enclosure. However, it would have been obvious that the transceiver comprise of protective enclosure in order to protect against natural phenomena, such as rain or temperature fluctuations.

Regarding claim 36, as shown in Fig. 5, Britz et al show a multiplexer (156) to combine multiple signal inputs and a de-multiplexer (154) to separate multiple signal outputs.

Regarding claim 38, Britz et al discloses free-space communication system, comprising:

a splitter in communication with the input to split the digital signal into a plurality of approximately equal laser data signals (as shown in Fig. 5, the serial to parallel converter (154) split the input signal into p a plurality of equal laser data signals, transmitted to laser transmitter (166));

a plurality of lasers (166) displaced from one another and facing in parallel directions, each of the lasers being in communication with the splitter (the lasers are in communication with the splitter);

Although Britz et al do not specifically disclose a plurality of laser drivers, however, it would have been obvious that there exist plurality of laser drivers to drive the laser transmitter (166).

Furthermore, Britz et al disclose free-communication system as discussed above and differ from the claimed invention in that Britz et al do not specifically discloses an input signal interface for receiving a digital signal. As shown in Fig. 1, Britz et al show plurality of devices communicating with each other. Therefore, it would have been obvious that there exist input signal interface for each device. One of ordinary skill in the art would have been motivated to provide such interface in order to convert the signal to a proper format and enable communication between other devices.

Britz et al disclose free space optical communication system comprising of transceiver and differ from the claimed invention in that Britz et al do not specifically disclose that the transceiver comprises of regenerator including first clock and data recovery which is switchable between one of the plurality of clock frequencies. However, in communication system it is well known to provide regenerators. Takahashi et al is cited to show such well known concept. In the abstract and col. 2, lines 46-61, Takahashi et al disclose recovery circuit which select clock signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide data regenerator as taught by Takahashi et al to the optical system of

Blitz et al. Since the optical signal is transmitted through communication medium, such as free-space, signal quality degrades over time, therefore one of ordinary skill in the art would have been motivated to provide such in order to recover and regenerate data.

4. Claims 5-9, 14, 15, 37, 40, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Britz et al (US Patent No. 6,731,878) in view of Takahashi et al (US Patent No. 6,771,729) and further in view of Kobayashi et al (US Patent No. 5,982,793).

Regarding claims 5 and 37, Britz et al discloses free-space communication system, comprising:

a splitter in communication with the input to split the digital signal into a plurality of approximately equal laser data signals (as shown in Fig. 5, the serial to parallel converter (154) split the input signal into p a plurality of equal laser data signals, transmitted to laser transmitter (166));

a plurality of lasers (166) displaced from one another and facing in parallel directions, each of the lasers being in communication with the splitter (the lasers are in communication with the splitter);

Although Britz et al do not specifically disclose a plurality of laser drivers, however, it would have been obvious that there exist plurality of laser drivers to drive the laser transmitter (166).

Furthermore, Britz et al disclose free-communication system as discussed above and differ from the claimed invention in that Britz et al do not specifically discloses an

input signal interface for receiving a digital signal. As shown in Fig. 1, Britz et al show plurality of devices communicating with each other. Therefore, it would have been obvious that there exist input signal interface for each device. One of ordinary skill in the art would have been motivated to provide such interface in order to convert the signal to a proper format and enable communication between other devices.

Britz et al disclose free space optical communication system comprising of transceiver and differ from the claimed invention in that Britz et al do not specifically disclose that the transceiver comprises of regenerator including first clock and data recovery which is switchable between one of the plurality of clock frequencies. However, in communication system it is well known to provide regenerators. Takahashi et al is cited to show such well known concept. In the abstract and col. 2, lines 46-61, Takahashi et al disclose recovery circuit which select clock signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide data regenerator as taught by Takahashi et al to the optical system of Blitz et al. Since the optical signal is transmitted through communication medium, such as free-space, signal quality degrades over time, therefore one of ordinary skill in the art would have been motivated to provide such in order to recover and regenerate data.

Furthermore, the combination of Britz and Takahashi et al disclose laser driver and differ from the claimed invention in that the combination does not disclose that the laser driver include amplifier and DC bias circuit. However, it is well known to provide laser driver with amplifier and DC bias circuit. Kobayashi et al is cited to show such well known concept. In col. 3, lines 50-60, Kobayashi et al disclose laser module comprising

amplifier and DC bias circuit. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide such circuitry. One of ordinary skill in the art would have been motivated to do such in order to provide sufficient power for the laser.

Regarding claim 6, as shown in Fig. 4, Britz et al shows that the each of the plurality of lasers further includes a lens for receiving and collimating the laser diode output into an optical beam (Fig. 3 shows telescope, which include lens to transmit the optical signal).

Regarding claim 7, Britz et al differ from the claimed invention in that Britz et al does not specifically disclose that the beamwidth of the optical beam is adjustable. However, it would have been obvious that the optical beam is adjustable. In the event that the system is misaligned, one of ordinary skill in the art would have been motivated to adjust the optical beam in order to re-aligned or re-focus the optical beam onto the receiving unit.

Regarding claims 8 and 9, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the beamwidth of the optical beam is adjustable between from 0.3 mrad to approximately 3.5 mrad. However, it would have been a matter of design choice to adjust the beamwidth to such values in order to focus the light beam onto the receiver system.

Regarding claims 14 and 45, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the laser driver operates at a current of

between approximately 100 milliAmperes and 1500 milliAmperes. However, it would have been a matter of design choice to operate the laser diode at such current level.

Regarding claims 15 and 46, Britz et al differ from the claimed invention in that Britz et al do not specifically disclose that the laser diode generates an average power of at least 80 milliwatts. However, it would have been a matter of design choice to operate the laser diode at such power level.

Regarding claim 40, as discussed above, the combination shows that the each of the plurality of lasers further includes a lens for receiving and collimating the laser diode output into an optical beam. The combination differs from the claimed invention in that Britz et al do not specifically disclose that the beamwidth of the optical beam is adjustable between to approximately 3.5 mrad or less. However, it would have been a matter of design choice to adjust the beamwidth to such values in order to focus the light beam onto the receiver system.

5. Claims 11, 12, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Britz et al (US Patent No. 6,731,878) in view of Takahashi et al (US Patent No. 6,771,729) in view of Kobayashi et al (US Patent No. 5,982,793) and further in view of Yamane et al (US Patent No. 4,813,048).

Regarding claims 11 and 42, the combination discloses laser driver for driving the laser and differs from the claimed invention in that the combination does not disclose sampling photodiode which is coupled to amplifier. However, it is well known to provide sampling photodiode coupled to the amplifier. Yamane et al is cited to show

such well known concept. In col. 2, lines 63-68 to col. 3, lines 1-25, Yamane et al disclose photodiode, which can be considered as sampling photodiode, coupled to the amplifier. Therefore it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide such sampling photodiode to the system of the combination. One of ordinary skill in the art would have been motivated to do such in order monitor and to adjust current level to the laser.

Regarding claims 12 and 43, as discussed above, Yamane et al disclose sampling photodiode which monitor current. Since current provides power to the laser, therefore it would have been obvious that power of the laser is monitored through the current measurement.

6. Claims 13, 44 and 47-79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Britz et al (US Patent No. 6,731,878) in view of Takahashi et al (US Patent No. 6,771,729) in view of Kobayashi et al (US Patent No. 5,982,793) and further in view of Carlson (US Patent No. 6,285,476).

Regarding claims 13 and 44, as discussed above, the combination discloses laser driver and differs from these claims in that the combination does not specifically disclose a thermoelectric cooler in thermal communication with the laser diode. However, in high power laser used in free-space communication system it is well known to provide a thermoelectric cooler. Carlson et al is cited to show such well known concept. In col. 4, lines 40-44, Carlson et al teach the use of thermoelectric coolers. Therefore, it would have been obvious to an artisan of rodinary skill in the art to provide

thermoelectric coolers to the laser of the combination. One of ordinary skill in the art would have been motivated to do such in order to cool the temperature of the laser in order to operate within a desired range.

Regarding claims 47-49, as discussed above, the combination differs from these claims in that the combination does not specifically disclose the digital signal a comprises packet-based communication signal in accordance with a data transmission protocol such protocol selected from the group consisting of TCP/IP, IPX, Fast Ethernet, SONET, and ATM. However, since Britz et al disclose communication system, it would have been obvious to communicate packet-based communication with such protocol. Carlson et al is cited to show that free-space communication is able to communicate packet-based signal with such protocol. In col. 8, lines 17-25, Carlson et al teach communication with such protocols. Therefore, it would have been obvious to an artisan of ordinary skill in the art to communicate with such protocols. One of ordinary skill in the art would have been motivated to do such in order to communicate with various networks system.

7. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Britz et al (US Patent No. 6,731,878) in view of Takahashi et al (US Patent No. 6,771,729) and further in view of Carlson et al (US Patent No. 6,285,476).

Regarding claims 16-18, the combination of Britz et al and Takahashi et al differs from these claims in that the combination does not specifically disclose the digital signal a comprises packet-based communication signal in accordance with a data

transmission protocol such protocol selected from the group consisting of TCP/IP, IPX, Fast Ethernet, SONET, and ATM. However, since Britz et al disclose communication system, it would have been obvious to communicate packet-based communication with such protocol. Carlson et al is cited to show that free-space communication is able to communicate packet-based signal with such protocol. In col. 8, lines 17-25, Carlson et al teach communication with such protocols. Therefore, it would have been obvious to an artisan of ordinary skill in the art to communicate with such protocols. One of ordinary skill in the art would have been motivated to do such in order to communicate with various networks system.

8. Claims 19-23, 26-33, 50, 51 and 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Britz et al (US Patent No. 6,731,878) in view of Takahashi et al (US Patent No. 6,771,729) and further in view of Carlson et al (US Patent No. 6,285,476).

Regarding claim 19, Britz et al discloses free-space communication system, comprising:

a splitter in communication with the input to split the digital signal into a plurality of approximately equal laser data signals (as shown in Fig. 5, the serial to parallel converter (154) split the input signal into p a plurality of equal laser data signals, transmitted to laser transmitter (166));

a plurality of lasers (166) displaced from one another and facing in parallel directions, each of the lasers being in communication with the splitter (the lasers are in communication with the splitter);

Although Britz et al do not specifically disclose a plurality of laser drivers, however, it would have been obvious that there exist plurality of laser drivers to drive the laser transmitter (166).

Furthermore, Britz et al disclose free-communication system as discussed above and differ from the claimed invention in that Britz et al do not specifically discloses an input signal interface for receiving a digital signal. As shown in Fig. 1, Britz et al show plurality of devices communicating with each other. Therefore, it would have been obvious that there exist input signal interface for each device. One of ordinary skill in the art would have been motivated to provide such interface in order to convert the signal to a proper format and enable communication between other devices.

Britz et al disclose free space optical communication system comprising of transceiver and differ from the claimed invention in that Britz et al do not specifically disclose that the transceiver comprises of regenerator including first or second clock and data recovery which is switchable between one of the plurality of clock frequencies. However, in communication system it is well known to provide regenerators. Takahashi et al is cited to show such well known concept. In the abstract and col. 2, lines 46-61, Takahashi et al disclose recovery circuit which select clock signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide data regenerator as taught by Takahashi et al to the optical system of

Blitz et al. Since the optical signal is transmitted through communication medium, such as free-space, signal quality degrades over time, therefore one of ordinary skill in the art would have been motivated to provide such in order to recover and regenerate data.

Furthermore, the combination discloses various lenses (in Fig. 2, Britz et al show photodiodes (68 and 69), which comprises of lens). The combination differs from the claimed invention in that the combination does not specifically disclose that the lenses have aperture and reflectors. However, since the lenses are used in free-space communication system therefore it would have been obvious that the lenses consist of aperture and reflectors. Carlson et al is cited to show such well known concept. As shown in Figs. 3 and 4, Carlson et al show aperture and reflectors. Therefore, it would have been obvious to an artisan of ordinary skill in the art to provide such lenses. One of ordinary skill in the art would have been motivated to do such in order to focus the optical beam and transmit the beam to long distances.

Regarding claims 20 and 55, the combination differs from the claimed invention in that the combination does not specifically disclose that the reflector has an f-number of about 0.67. However, it would have been a matter of design choice to provide the reflector with f-number of about 0.67.

Regarding claim 21, the combination differs from the claimed invention in that the combination differs does not specifically disclose that the reflector is a Mangin mirror. However, reflector such as Mangin mirror is well known. Therefore, it would have been a matter of design choice to provide the reflector as a Mangin mirror.

Regarding claims 22 and 51, the combination discloses lenses and differ form the claimed invention in that the combination does not spin view of the above, as shown in Figs. 3 and 4, Carlson et al show that the reflector is a mirror having a general conic, aspheric, or parabolic optical surface that is coupled with one or more corrector lenses.

Regarding claim 23, in view of the above, Carlson et al further disclose light baffle (see col. 2, lines 9-10, col. 5, lines 21-22 and Fig. 2).

Regarding claim 26, as shown in Fig. 2, Carlson et al shows a background rejection filter (210) near the focal point of the reflector.

Regarding claim 27, the combination of Britz et al and Carlson et al differs from the claimed invention in that the combination does not specifically disclose that the background rejection filter is a bandpass filter. However, it would have been a matter of design choice to provide a bandpass filter in order to reject a certain type of noise.

Regarding claims 28, 29, 53 and 54, in col. 5, lines 60-62, Carlson et al further disclose that the background rejection filter is an optical interference filter and has a nominal center wavelength of approximately 1550 nanometers.

Regarding claim 30, as shown in col. 2, lines 30-36, Britz et al disclose communication through radio frequency link.

Regarding claim 31, the combination of Britz et al and Carlson et al differs from the claimed invention in that the combination does not specifically disclose monitoring circuitry for monitoring signal strength or transceiver status. However, in col. 5, lines 1-30, Britz et al disclose routing between various transceivers. Therefore, there must be a monitoring circuit to monitor status of the transceiver.

Regarding claims 32 and 33, the combination does not disclose that the backup transceiver is activated upon detecting impairment of the laser transceiver, and the backup transceiver is deactivated upon detecting non-impairment of the laser transceiver. However, it would have been obvious to activate the backup receiver upon detecting impairment.

Response to Arguments

9. Applicant's arguments with respect to claims 1, 5, 37, 38, 19 and 50 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalzid Singh whose telephone number is (571) 272-3029. The examiner can normally be reached on Mon-Fri 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272--3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DS
August 19, 2005

M. R. SEDIGHIAN
PRIMARY EXAMINER